

AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier. Those claims not cancelled or withdrawn but amended by the current amendment utilize the following notations for amendment: 1. deleted matter is shown by strikethrough; and 2. added matter is shown by underlining.

Claims 1-21 (Cancelled).

Please add new claims 22-42 as follows:

22. (New) Light emitting apparatus comprising:

a) a light source including a light emitting diode device; and

b) a cooling system for cooling the light source comprising:

i) a thermoelectric cooling device connected via a heat conductor to the light source; and

ii) a heat exchange system for removing heat from the thermoelectric cooling device, the thermoelectric cooling device being positioned between the heat conductor and the heat exchange system.

23. (New) Apparatus according to claim 22, wherein the apparatus is so arranged that, in use, the temperature of the region of the heat conductor immediately adjacent to the thermoelectric cooling device is able to be maintained below -10° Celsius.

24. (New) Apparatus according to claim 22, wherein the apparatus is arranged to emit, in use, light having an optical power density of greater than 0.1 Wcm^{-2} .

25. (New) Apparatus according to claim 22, wherein the light source is arranged and configured to emit light, in use, having an energy peak at a wavelength between 570nm and 600nm.

26. (New) Apparatus according to claim 22 wherein the thermoelectric cooling device comprises a Peltier cooling device.

27. (New) Apparatus according to claim 22, wherein the heat exchange system utilizes liquid coolant.

28. (New) Apparatus according to claim 22, wherein the light source comprises a plurality of light emitting diode devices arranged in a two-dimensional array.

29. (New) Apparatus according to claim 28, wherein at least two of the light emitting diodes in the array are packaged and arranged so that the separation between the centers of the

light emitting diodes is less than the diameter of the notional circular cylinder that envelopes the packaging of the light emitting diodes.

30. (New) Apparatus according to claim 28, wherein at least two of the light emitting diodes in the array share the same packaging.

31. (New) Apparatus according to claim 22, wherein the heat conductor comprises a heat spreader.

32. (New) Apparatus according to claim 22, wherein a further heat conductor is arranged to transfer heat from the thermoelectric cooling device to the heat exchange system.

33. (New) Apparatus according to claim 22, wherein the cooling system comprises one or more heat pipes for conducting heat to or from a part of the cooling system.

34. (New) Apparatus according to claim 22, wherein the thermoelectric cooling device is arranged to be controlled to determine the heat transfer out of the heat conductor and/or into the heat exchange system.

35. (New) Apparatus according to claim 34, wherein the apparatus includes a control means for controlling the current to the thermoelectric device.

36. (New) A cooling system for a light source arrangement, the cooling system comprising:

- i) a thermoelectric cooling device connected to a heat conductor; and
 - ii) a heat exchange system for removing heat from the thermoelectric cooling device,
- the cooling system being arranged to be connected to a light source via the heat conductor, the thermoelectric cooling device being positioned between the heat conductor and the heat exchange system.

37. (New) A method of cooling a light source comprising the steps of:

- a) providing and operating a light source including a light emitting diode device; and
- b) cooling the light source by means of performing the following steps:
 - i) removing heat from the light source with a thermoelectric cooling device, and
 - ii) removing heat from the thermoelectric cooling device with a heat exchange system, the thermoelectric cooling device being positioned between the heat conductor and the heat exchange system.

38. (New) A method according to claim 37, wherein the region of the cooling system at the junction between the heat conductor and the thermoelectric cooling device is maintained at a temperature of less than -10° Celsius.

39. (New) A method according to claim 37, wherein the light source is operated to produce light having an optical power density of greater than 0.1 Wcm^{-2} .

40. (New) A method according to claims 37, wherein the light source is operated to emit light having an energy peak at a wavelength between 570nm and 600nm.

41. (New) A method according to claim 37, wherein the rate of heat removed from the light source is greater than 5 Wcm⁻².

42. (New) A method of increasing the optical power density attainable with a light source including performing the method according to any of claim 37.